

NOTES ON TWO SOUTHERN AFRICAN *ARCTOTIS* SPECIES (ARCTOTIDEAE: ASTERACEAE) GROWING IN CALIFORNIA

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ABSTRACT

A literature review and determination of specimens performed in conjunction with treatment preparations for the Flora of North America North of Mexico and the second edition of The Jepson Manual indicates that the names in use for two *Arctotis* species (Arctotideae: Asteraceae) occurring in California need updating. *Venidium fastuosum* (Jacq.) Stapf, a rare escape from cultivation, should be *Arctotis fastuosa* Jacq. (Pl. hort. schoenbr. 2: 20, pl. 166; 1797) and *A. venusta* Norl. (Bot. Not. 118: 406-7; 1965) is the correct name for a naturalized species previously determined as *A. stoechadifolia* P.J. Bergius.

Key Words: Arctotideae, *Arctotis*, Asteraceae, naturalization, *Venidium*.

The only members of tribe Arctotideae (Asteraceae) with established populations in North America occur in California and New Mexico (Mahoney 2006). All are southern African species introduced through horticulture. Among them, only one species is potentially invasive; the others range from occasional to naturalized garden escapes with limited distributions. Munz and Keck (1973) and McClintock (1993) treated four species: *Gazania linearis* (Thunb.) Druce [*G. longiscapa* DC.], *Arctotheca calendula* (L.) Levyns, *Venidium fastuosum* (Jacq.) Stapf, and *Arctotis stoechadifolia* P.J. Bergius.

Naturalized populations of *G. linearis* (treasure-flower) occur along roadsides, especially in urban coastal areas of Santa Barbara and Los Angeles Counties. Entities treated previously as *Arctotheca calendula* (capeweed) (Munz and Keck 1973; McClintock 1993) actually consist of two distinct species. *Arctotheca prostrata* (Salis.) Britten is a sterile perennial that spreads aggressively by prostrate stems along roadsides and in other disturbed sites in the North Coast (NCo), South Coast (SCo), Central West (CW), and Western Transverse Ranges (WTR) floristic province subregions of California. *Arctotheca calendula*, a fertile annual classified as invasive by the California Exotic Pest Plant Council (Brossard et al. 2000), occurs in a few coastal and disturbed urban habitats in the NCo, Central Coast (Cco), and Outer South Coast Ranges (SCoRO) subregions.

The present paper is confined to updating names and identities of *Venidium fastuosum* (monarch-of-the-veld) and *Arctotis stoechadifolia* (blue-eyed African daisy).

Venidium fastuosum

The genus *Arctotis* is characterized principally by achenes with three \pm well-developed abaxial wings that create one or two distinct furrows or “cavities” (McKenzie et al. 2005). *Venidium* was segregated from *Arctotis* by Lessing (1831, 1832) based on the less well-developed achene wings, the absence or extreme reduction of pappus scales, and differences in achene pubescence. Beauverd (1915) and Lewin (1922) found the distinguishing characters used by Lessing untenable and transferred *Venidium* species into *Arctotis*, but Stapf (1926) disagreed and transferred *A. fastuosa* Jacq. to *Venidium*. Use of the name *V. fastuosum* has persisted in U.S. floral treatments (Munz and Keck 1973; Liberty Hyde Bailey Hortorium 1976; McClintock 1993; Quattrocchi 2000; Calflora 2007; USDA 2007).

A morphological study of achenes and initial molecular analyses of subtribe Arctotidinae (McKenzie et al. 2005, 2006; Funk et al. 2007) support Beauverd’s and Lewin’s observations for some of the species previously placed in *Venidium*. Results from a larger molecular study of Arctotidinae (McKenzie and Barker 2008) indicate that although *Arctotis* s.l. is polyphyletic and needs redefining, California’s *Arctotis* species will retain their names. Based on these new data, the name *Arctotis fastuosa* Jacq. should be adopted for the species previously known as *Venidium fastuosum*.

Arctotis fastuosa is a hirsute to lanate, taprooted annual with heads up to 10 cm in diameter. Its rays are bright orange to yellow (a white-rayed form is in cultivation), usually

marked basally with a purple-black band; its discs are yellowish-brown. The species is native to the semi-arid, winter-rainfall Namaqualand region of South Africa. Stapf (1926) referred to *A. fastuosa* as a weed of cornfields in its native range, where it is now common on roadsides, but in California it very rarely escapes from cultivation and does not appear to have naturalized. We are not aware of the species being a problematic weed in any country. McKenzie et al. (2005) found that herbarium specimens determined as *A. fastuosa* can be divided into at least three distinct entities based on achene morphology. We have been able to examine achenes from two Californian specimens (*Fuller 8191*, CDA; *R. Whitaker s.n.*, RSA); in both, achenes lack pappi, pubescence, and basal tufts of hairs and are readily referable to typical *A. fastuosa*.

Specimens examined. USA, CA, Riverside Co., Thermal, establishing itself, 10 March 1949, *Whitaker s.n.* (RSA), 5.2 mi S of Beaumont, roadside sand, 17 February 1960, *Fuller 3609* (CDA); San Bernardino Co., San Bernardino, NE of Central Ave. & 3rd St, Gate 5, Norden AFB, waste ground, 11 April 1962, *Fuller 8191* (CAS, CDA).

Arctotis stoechadifolia and *A. venusta*

During a 1939–40 study of *Arctotis* specimens, Norlindh (1964) found that in the last revision of Arctotidinae, Lewin (1922) had misinterpreted *A. stoechadifolia* P.J. Bergius, a prostrate, mat-forming perennial occurring in open sandy, seasonally wet areas and stabilized dunes in the southwestern Cape. Lewin applied this name to an erect, tap-rooted annual occurring in a wider range of habitats and with a broader distribution in inland southern Africa (Norlindh 1964). The native ranges of the two entities do not overlap. Although Norlindh (1965) subsequently described and named the annual species *A. venusta* Norl., Lewin's interpretation has been adopted widely. *Arctotis venusta* is a popular horticultural plant and is often grown under the name *A. stoechadifolia*, *A. stoechadifolia* var. *grandis* (Thunb.) Less. or *A. grandis* Thunb. Sometimes the names *A. stoechadifolia* and *A. venusta* are treated as synonyms (Brickell and Zuk 1996). Mahoney's (2006) FNA treatment maintained the name *A. stoechadifolia* but commented on its probable misuse. A full investigation subsequent to preparation of that treatment and availability of further data have clarified the identity of the Californian specimens.

Arctotis stoechadifolia and *A. venusta* are morphologically distinct species (Norlindh 1964). Fresh plants cannot be confused. *Arctotis stoechadifolia* is a mat-forming perennial that produces long (up to ± 1 m), adventitiously rooting, prostrate stems from which the erect

flowering shoots arise. Its ray florets are white or pale yellow; its discs are black. The silver-grey leaves have a dense, tightly appressed woolly tomentum on both the upper and lower surfaces. The outer involucre bracts have a rigid base and a 4–7 mm long, acuminate, linear-cylindrical apical appendage. The obovoid-obconical achenes are densely tomentose and bear strongly incurved, \pm entire lateral wings that partially conceal the abaxial 'cavities.' *Arctotis venusta* is an erect, tap-rooted, summer-flowering annual. Its ray florets are white with a narrow yellow band at the base of the limb; its discs are a distinctive greyish-purple. The leaves are usually more thinly and loosely tomentose. The outer involucre bracts have a soft base and a short, 1–3 mm long appendage with a rounded or obtuse apex. The oblong-obconical achenes are \pm glabrous to sparsely tomentose on the abaxial and tangential surfaces and the oblong-obovate cavities are obvious. Herbarium specimens can be more difficult to distinguish due to faded florets and missing lower-stem or below-ground parts, but the differences in leaf pubescence, involucre bract and achene features allow discrimination of the two species.

Our determination of Californian specimens from horticulture and naturally-occurring populations previously determined as *A. stoechadifolia* confirms that they belong to *A. venusta*. No specimens of *A. stoechadifolia* have been observed. Norlindh (1964) noted that *A. venusta* is weedy even in its native range, often occurring in cultivated fields or along roadsides, while *A. stoechadifolia* does not readily tolerate competition so that some populations have disappeared due to urban sprawl and the planting of erosion-preventing trees and shrubs. Wells et al. (1986) classified *A. venusta* as a ruderal, agrestal and pastoral weed in South Africa. Stated undesirable characteristics include: that it may be poisonous to stock, it taints milk, and is a crop-seed contaminant. *Arctotis venusta* is predicted as highly likely to become a weed, and furthermore to become an agricultural weed, in Australia (Scott and Panetta 1993). It appears that *A. venusta* has been cultivated in California for at least 150 years but in that time has not naturalized extensively. However, all but one of the Californian specimens of *A. venusta* we examined were collected before 1971; whether this reflects its rarity or a lull in active collecting is unclear. It is interesting that naturalized Californian populations of *A. venusta* occur in coastal, sandy habitats that might be favored by *A. stoechadifolia*, even though *A. venusta* is an inland species occurring in rangeland habitats far from the coast in its native range in southern Africa.

The true *Arctotis stoechadifolia* has become naturalized along parts of the coastline of

Australia (Jeanes 1999; Rippey and Rowland 2004; Barker et al. 2005) due to its popularity as a garden ornamental plant and its use as a dune stabilizer. It inhabits the fore-dune through to open sites in the protected hind-dune area, as in its indigenous range in South Africa. The species has been assessed to be a minor problem weed in natural ecosystems warranting control at four or more locations within a state or territory in Australia (Groves et al. 2003). In parts of South Australia, it has a high Weed Risk Assessment rating, as the dense mats smother smaller indigenous plants by shading and competition for resources and can alter dune shape (Cordingley and Petherick, 2005). Therefore, if *A. stoechadifolia* is cultivated in California we recommend assessment of its weed risk potential and vigilance for naturalized plants to ensure it does not become a problem species in California.

Specimens examined. USA, CA, Los Angeles Co., Glendora, Alostia Ave. at Glendora Ave., 750 ft., dry roadside, 24 June 1933, *Wheeler 1889* (CDA, RSA, UCR); [county name illegible, probably Los Angeles], Ocean Park, sand lots near beach, 2 August 1934, *Cohen* [?] 515 (RSA); Orange Co., 2 mi NE of Huntington Beach near N end of Bolsa Chica Salt Marsh, disturbed roadside, infrequent escape, 25 July 1970, *Henrickson 5091* (RSA), Newport Bay, 10 ft., sandy flat just back of high tide, 21 October 1933, *Wheeler 2224* (RSA); Santa Barbara Co., Santa Maria, N side of W Jones St E of S Curver [sic. probably Curryer] St., naturalized in waste ground, 21 May 1968, *Fuller 17065* (CDA), Santa Maria, 100 E Main, vacant lot, 22 September 1965, *Jones & Allen s.n.* (CDA), Lauro Canyon Dam Project, roadside, 30 May 1952, *Pollard s.n.* (CDA), Hwy between Santa Maria and Orcutt, sandy soil along highway, 22 November 1960, *Smith 6332* (RSA, SBBG, UCR); Ventura Co., Ojai, Canada St., 12 July 1946, *Pollard s.n.* (CAS).

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